## **ELECTRONIC INFORMATION DISCLOSURE STATEMENT**

Electronic Version v18 Stylesheet Version v18.0

Title of Invention

SYNTHESIS AND EVALUATION OF NEW CYANINE DYES AS MINOR GROOVE OF [POLY(dA-dT)]2 BINDERS

**Application Number:** 

Confirmation Number:

First Named Applicant:

**Gunnar Westman** 

Attorney Docket Number: STRM.P001

Search string:

(5656449).pn.

## **US Patent Documents**

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

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## Signature

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PTO/SB/08a (08-03)
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				Application Number	10/605,961	
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	STATEMENT BY AP	PLI	CANT	First Named Inventor	Westman et al.	
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			U.S. PATENT (	DOCUMENTS	
Examiner Initials*	Cite	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or	Pages, Columns, Lines, Where
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	FOREIGN PATENT DOCUMENTS									
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document Country Code* -Number*- Kind Code* (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T°				
b//_		WO 01/94473 A1	12/13/2001	Lightup Technologies AB et al.						
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	NON PATENT LITERATURE DOCUMENTS							
Examiner Initials*	Cite No.¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T²					
he		CARLSSON ET AL., Optical and photophysical properties of the oxazole yellow DNA probes YO and YOYO, J. Phys. Chem., 1994, Page(s) 10313-10321, Volume 98						
BI		COLSON ET AL., Electric linear dichroism as a new tool to study sequence preference in drug binding to DNA, Biophysical Chemistry, 1996, Page(s) 125-140, Volume 58						
BN		DELIGEORGIEV ET AL., Preparation of Intercalating Dye Thiazole Orange and Derivatives, Dyes and Pigments, 1995, Page(s) 315-322, Volume 29, Number 4						
hp		GURRIERI ET AL., Direct Visualization of Individual DNA Molecules by Fluorescence Microscopy: Characterization of the Factors Affecting Signal/Background and Optimization of Imaging Conditions Using YOYO, Analytical Biochemistry, 1997, Page(s) 44-53, Volume 249						
Ba		HAUGLAND , Nucleic Acid Stains, Handbook of Fluorescent Probes and Research Chemicals, 1996, Page(s) 144-152, 6th Edition, Number 8						
By/		ISACSSON ET AL., Solid-phase synthesis of asymmetric cyanine dyes, Tetrahedron Letters, 2001, Page(s) 3207-3210, Volume 42						
he		JORGENSON ET AL., Interaction of Hoechst 33258 with Repeating Synthetic DNA Polymers and Natural DNA, Journal of Biomolecular Structure & Dynamics, 1988, Page(s) 1005-1023, Volume 5, Number 5						
1/1		KAPUSCINSKI ET AL., Fluorescent complexes of DNA with DAPI 4'6-diamidine-2-phenyl indole.2HCl or DCI 4',6-dicarboxyamide-2-phenyl indole, Nucleic Acids Res., 1978, Page(s) 3775-3799, Volume 5, No. 10						
By		KUBISTA ET AL., Characterization of Interaction between DNA and 4',6-Diamidino-2-phenylindole by Optical Spectroscopy, Biochemistry, 1987, Page(s) 4545-4553, Volume 26						
51		LARSSON ET AL., Characterization of the Binding of YO to [Poly(dA-dT)] <sub>2</sub> and [Poly (dG-dC)] <sub>2</sub> , and of the Fluorescent Properties of YO and YOYO Complexed with the Polynucleotides and Double-Stranded DNA, Biopolymers, 1995, Page(s) 153-167, Vol. 36						
Php		LARSSON ET AL., Characterization of the Binding of the Fluorescent Dyes YO and YOYO to DNA by Polarized Light Spectroscopy, 1994, Page(s) 8459-8465, Volume 116						

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INFORMATION DISCLOSURE				Filing Date	11/10/2003	
STATEMENT BY APPLICANT				First Named Inventor	Westman et al.	
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4p		LEE ET AL., Thiazole Orange: A New Dye for Reticulocyte Analysis, Cytometry, 1986, Page(s) 508-517, Volume 7					
H		LYNG ET AL., The CD of LigandDNA Systems. 2. Poly (dA-dt) B-DNA, Biopolymers, 1992, Page(s) 1201-1214, Volume 32					
BP		MATSUZAWA ET AL., Change of the Higher Order Structure in a Giant DNA Induced by 4',6-Diamidino-2-Phenylindole as a Minor Groove Binder and Ethidium Bromide as an Intercalator, Nucleosides & Nucleotides, 1994, Page(s) 1415-1423, Volume 13, Number 6 & 7					
BA	/	MIKHEIKIN ET AL., Binding of Symmetrical Cyanine Dyes into the DNA Minor Groove, Journal of Biomolecular Structure & Dynamics, 2000, Page(s) 59-72, Volume 18, No. 1					
BP	•	MITAL ET AL., Synthesis of Some 5-Substituted 2-Aminobenzenethiols and their Conversion into Phenothiazines via Smile Rearrangement, J. Chem. Soc., 1969, Page(s) 2148-2150					
BI		NAIM ET AL., Studies in antiparasitic agents: Part 17 Synthesis of 2-acylamino-6-substituted-benzthiazoles as potential anthelmintic agents, Indian Journal of Chemisty, 1991, Page(s) 494-498, Volume 30B					
M		NEIDLE, Crystallographic Insights into DNA Minor Groove Recognition by Drugs, Biopolymers, 1997, Page(s) 105-121, Volume 44					
BI		NETZEL ET AL., Base-Content Dependence of Emission Enhancements, Quantum Yields, and Lifetimes for Cyanine Dyes Bound to Double-Strand DNA: Photophysical Properties of Monomeric and Bichromophoric DNA Stains, J. Phys. Chem., 1995, Page(s) 17936-17947, Volume 99					
140		NORDEN ET AL., Linear dichroism spectroscopy of nucleic acids, Quarterly Review of Biophysics, 1992, Page(s) 51-170, Volume 25, No. 1					
hal		NYGREN ET AL., The Interactions Between the Fluorescent Dye Thiazole Orange and DNA, Biopolymers, 1998, Page(s) 39-51, Volume 46					

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BP		OGUL'CHANSKY ET AL., Interactions of cyanine dyes with nucleic acids. XXIV. Aggregation of monomethine cyanine dyes in presence of DNA and its manifestation in absorption and fluorescence spectra, Spectrochimica Acta - Part A, 2001, Page(s) 1525-1532, Volume 57					
M		PETTY ET AL., Thermodynamic Characterization of the Association of Cyanine Dyes with DNA, J. Phys. Chem. B, 2000, Page(s) 7221-7227, Volume 104					
By		RYE ET AL., Stable fluorescent complexes of double-stranded DNA with bis-intercalating asymmetric cyanine dyes: properties and applications, Nucleic Acids Res., 1992, Page(s) 2803-2812, Volume 20, Number 11					
B		SEIFERT ET AL., Spontaneous Assembly of Helical Cyanine Dye Aggregates on DNA Nanotemplates, J. Am. Chem. Soc., 1999, Page(s) 2987-2995, Volume 121					
M		SINGER ET AL., Characterization of PicoGreen Reagent and Development of a Fluorescence-Based Solution Assay for Double-Stranded DNA Quantitation, Analytical Biochemistry, 1997, Page(s) 228-238, Volume 249					
13/		SVANVIK ET AL., Light-Up Probes: Thiazole Orange-Conjugated Peptide Nucleic Acid for Detection of Target Nucleic Acid in Homogeneous Solution, Analytical Biochemistry, 2000, Page(s) 26-35, Volume 281					
Ba		WILSON ET AL., Binding of 4',6-Diamidino-2-phenylindole (DAPI) to GC and Mixed Sequences in DNA: Intercalation of a Classical Groove-Binding Molecule, J. Am. Chem. Soc., 1989, Page(s) 5008-5010, Volume 111					
By		YOSHINAGA ET AL., Intercalating Fluorescence Dye YOYO-1 Prevents the Folding Transition in Giant Duplex DNA, Biochemical and Biophysical Research Communications, 2001, Page(s) 264-267, Volume 286					
By		ZHOU ET AL., Blue Sensitizing Dyes: Synthesis, Spectroscopy, and Performance in Photographic Emulsions, Journal of Imaging Science and Technology, 1995, Page(s) 244-252, Volume 39, Number 3					
M		ZUBAROVSKII ET AL., Asymmetric imidacarbocyanines with hetaryls as substituents, Chemical Abstracts, 1975, Page(s) 851-854, Volume 41, No. 8	Abs				
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